THE DENTAL PRACTITIONER

AND DENTAL RECORD

Including the official reports of the British Society of Periodontology, the British Society for the Study of Orthodontics, the European Orthodontic Society, the Liverpool and District Odontological Society, the North Staffordshire Society of Dental Surgeons, the Odonto-chirurgical Society of Scotland, and the Dental and Medical Society for the Study of Hypnosis

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SMITH, J. A. K. (1949), *Brit. dent. J.*, **86**, 271.

LEWIS, R. W. B. (1947), *The Jaws and Teeth*, 2nd ed., 471. London: Science Publishing Co.

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THE DENTAL PRACTITIONER
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Vol. VII, No. 4 December, 1956

EDITORIAL

ACCIDENTS DO HAPPEN

It is a common thought in life that accidents always happen to the other person and never to ourselves. It is not until they happen to us that we suddenly realize the serious consequences that can arise in a busy practice through a sudden unfortunate accident. This fact has been brought home to us somewhat vividly when one of our colleagues recently fractured an ankle very badly. It meant nearly seven weeks away from practice and three weeks working under extreme difficulty with the leg in plaster. The cause of the accident was all too simple—merely tripping over in the garden, but it caused tremendous inconvenience to patients and practice as well as loss of earning power. Our colleague was more than fortunate in some ways as he had a partner and had taken out various insurance policies against the evil day when an accident would and did happen. Nothing ever makes up completely for the sudden loss of a principal in a practice, as the expenses still go on accumulating and wages have to be paid, to say nothing of keeping the home fires burning. To believe that accidents never happen to oneself is the height of folly and it behoves each practitioner to ensure that he is adequately covered by insurances. The National Health Insurance benefits to which we are all entitled are of meagre assistance to the professional man in a busy practice and additional forms of insurance should always be taken out. The form of this insurance may vary a great deal and will depend upon the individual factors of each practitioner, and his particular circumstances and requirements. Many people undoubtedly favour the form of sickness and accident policy covered by such societies as the Dentists' Provident Society and the Dentists' and General Mutual Benefit Society, where accumulated profits are distributed to subscribers, who are "shareholders" and is in fact a form of endowment saving scheme as well as an insurance against sickness. Further benefits may be claimed by an insurance policy through one of the many well-known insurance companies at rates according to the premiums.

Most men, however, in these days are adequately covered for the accident or illness of reasonably short duration. It is as well to bear in mind there are insurance policies at reasonably low premiums that cover benefits for long illnesses. Within reason the average practitioner can recover fairly quickly from a short period up to six weeks. Illness lasting for nine to twelve months can be more than serious in a practice and special attention should be given to this form of insurance. Accidents do happen and it is essential that adequate cover is provided for home and practice.

CLINICAL AND PRACTICAL VIEWS IN CHILDREN'S DENTISTRY*

By **F. STRØM**, L.D.S., *Oslo, Norway*

MANY well-known authorities in our profession have emphasized that the only way to take care of the teeth of the individual throughout life is to start with the small child. It may perhaps be of some interest to discuss the plan followed by me and the aim I have set myself in the treatment of children.

The dental care of the children is based upon systematic examination and treatment, starting when the child is 3 years old and continuing at intervals of 7–8 months throughout life. One hundred and twenty-five of my child patients, born between 1932 and 1948, have been thus cared for to this day. None of these has lost a deciduous tooth before shedding time. Further, no permanent tooth has been lost, except one central incisor in a traffic accident, and no endodontic treatment has been necessary for any tooth, deciduous or permanent.

The plan followed can be described under three headings:—

1. Prophylaxis, general as well as local.
2. Diagnosis, as early as possible.
3. Treatment.

PROPHYLAXIS

It is essential that the pregnant mother is informed of what constitutes adequate nutrition both for herself during pregnancy and for her child at the various age periods. Reference can be made to the works of K. Toverud and others (1950) and G. Toverud (1950 and 1951); their principles have been used as a basis for my own general prophylactic methods.

In the local prophylaxis it is the responsibility of the parents to assist and supervise their children in the maintenance of an adequate oral hygiene programme. The mother is taught the methods to be employed in the care of the child's mouth. Up to the age of 7 or 8 years, the brushing of the child's teeth should be done by the parents. If there is a tendency for food to accumulate, the teeth should be brushed after each meal. If the food debris cannot be removed with brushing or rinsing, the parent is given a little dental probe which can be used to remove it. The patients are also requested to use the tongue to clean their teeth after the meal.

DIAGNOSIS

Diagnosis of caries, malocclusion, and marginal periodontitis must be made as early as possible. Only diagnosis of caries will be discussed in detail.

It can at once be stated that root-canal treatment has been avoided in these 125 children because of two special precautions. Firstly because X rays are used in diagnosing approximal caries. Secondly, because all fissures, pits, and foramina cæca, without exception, are opened with burs and permanently filled.

It has been proved by several authors that examination with probe and mirror of approximal surfaces is insufficient and that it is necessary to supplement the clinical examination with an X-ray examination. There is now full agreement as to the value of an X-ray examination in this respect.

On the first appointment of the 3-year-old child, radiographs are taken of the molars if they are in contact. Clinical examination with probe and mirror will be undertaken at the next visit, when the radiographs are ready. The diagnosis is based on the clinical as well as on the X-ray examination. This is repeated every 7–8 months. How often one should take a series or single radiographs will depend on so many circumstances, but for all patients above 12 years a full mouth series is taken routinely every second year throughout life.

The orthodontic evaluation of the dentition is entirely left to an orthodontist. At the age

* Invitation Lecture given to the Junior Dental Staff, the London Hospital Dental School, May, 1956.

of 4–5 years, a complete analysis of the dentition is made by him, based on the examination of models, radiographs, and clinical observations.

TREATMENT

Caries.—It is well known that fissures and pits are places prone to caries and that various methods are recommended for preventing caries in such areas. One of the methods consists of grinding the tooth for elimination of food-retaining areas. If this method succeeds in eliminating fissures and pits, it is very uncertain whether the dentin under the remaining enamel is intact. If the dentin is already affected, the process will go on in spite of the elimination of the fissures.

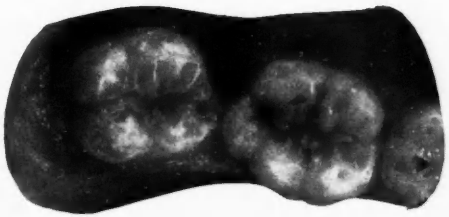

Fig. 1.—The second permanent molar, macroscopically without fissure caries.

It seems that the method which Hyatt recommended in 1923 known as "prophylactic odontotomy", is misunderstood by many colleagues who believe that the method consists mainly of grinding. If Hyatt's work is consulted it will be seen that he cannot be held responsible for this misconception. He only mentions the grinding process for immunization of pits and fissures and in his book (1933) he says, "The immunization operation is applicable in only a comparative few instances, the filling operation being indicated in possibly 90 per cent of the cases presented."

According to Hyatt, instead of looking for decay, for open carious cavities, we must learn carefully to examine non-carious teeth and find out whether they have any tiny openings. He further defines a pit and a fissure, saying as follows: "For all practical purposes a pit or fissure is an opening in the enamel into which the point of the explorer will sink *below* the surface at the point of entrance, and cling between its narrow walls." For such a clinical finding he recommends an ordinary filling. These rules have been followed

Fig. 2.—Radiographs of the second permanent molar, as shown in *Fig.* 1. Above, before the horizontal grinding; below, after finishing grinding.

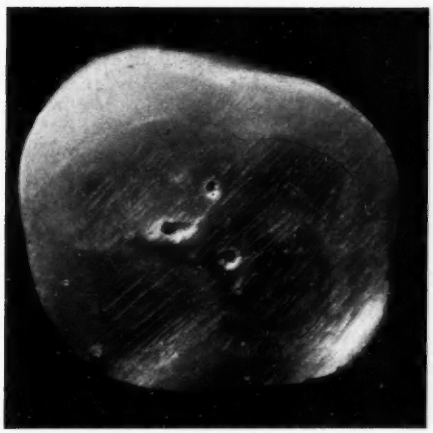

Fig. 3.—The spots remaining in the dentin after the finishing grinding. (× 5.)

strictly in my practice, and clinical observation has confirmed that such a procedure is well founded.

Autopsy material from a child aged 12 illustrates this point (*Fig.* 1). The second permanent molar has a fissure in which a

probe clings between the narrow walls at one point, but there was no caries to be seen macroscopically. The occlusal surface of the tooth was ground horizontally in such a way that all occlusal enamel was removed. In spite of grinding to a level as shown in *Fig.* 2, small spots were found in the dentine where the probe would penetrate (*Fig.* 3). These spots consisted of a white substance. Similar spots, usually white, sometimes black or brown, have always been found when preparing pits and fissures. However, all too little is known about these spots. It would be of great interest to determine their nature histologically. As I think that they may have something to do with a penetrating carious process, they should be completely eliminated before the filling is inserted. The earlier treatment can be started on pits and foramina cæca the better, for then the nerve-straining work that follows when the process has been allowed to penetrate more deeply, will be spared us.

Filling Material.—I firmly agree with Scharfenberg (1949) when he states that copper amalgam does *not* belong in dentistry for children. His article concludes as follows:—

1. Regardless of the manipulation, copper amalgam sets more slowly than silver amalgam.
2. Copper amalgam always contracts upon setting.
3. Copper amalgam is germicidal simply because it is slightly soluble in oral fluids.
4. Since copper amalgam is soluble, it tends to wash out of the cavity.
5. Experimentally copper amalgam was shown to cause marked tissue reactions.
6. Since it is slow to set, copper amalgam is difficult to pack and also it is difficult to do anatomical carving.
7. Copper amalgam does cause a staining of tooth structure.

Personally, I have used silver amalgam exclusively for more than 20 years in deciduous teeth, at first with a cavity lining of oxyphosphate cement. However, for more than 15 years cavities of a normal depth have been left unlined. The silver amalgam is inserted directly on the pulpal wall after an ordinary washing of the cavity with alcohol and drying with air. This technique is recommended without hesitation. Such silver amalgam fillings have not resulted in symptoms. Routine radiographs confirm that the pulp remains undamaged.

For all Class II fillings a fixed ring matrix is used and this remains in situ till the next day. The fixed matrix is especially applicable for small patients as it secures the filling and prevents fractures of it, which often occur when using a matrix that is removed immediately after the filling is inserted. Further, a fixed matrix allows the construction of an optimal height of the occlusal margin, which is often difficult to obtain by using the so-called removable matrix.

Gingivitis.—Only the treatment of a special type of chronic marginal gingivitis will be mentioned. It is often found in the region of the upper front teeth of children between 10 and 12 years old. It appears as a hypertrophic swelling near the free gingival margin running horizontally. The histological picture shows a hypertrophic inflammation of the gingiva with formation of an excess of connective tissue in the outer layer, and epithelial proliferation and round-cell infiltration are found in the deeper layer against the tooth. Because of this marginal swelling cleaning of the teeth will be difficult. This is especially true in cases where the brushing is performed vertically from above and downwards on teeth of the upper jaw. The bristle of the toothbrush will, as it runs over the swelling, make a jump and reach the crown at some distance from the gingival margin.

This may create an area where food debris will persist and as a result one may often notice a decalcified zone. As this swelling has a tendency to remain it will be necessary to remove the excess tissue by surgical means. This treatment is very simple.

After local injection a horizontal incision is made labially at the upper border of the swelling, and the gingiva is then removed with a suitable instrument such as a scaler. After this has been done, the edge created by the incision is now rounded with a pair of scissors along the margin. Some vertical deepenings are cut in the areas of the embrasures of the

teeth in such a way that channels are formed. No surgical packing is used, but the child or the parent uses tweezers to paint the wound with a 3 per cent peroxide solution twice daily. After four days the child is re-examined and subsequently an 8 per cent zinc chloride solution is substituted for the peroxide and used for 14 days. It is always gratifying to apply this surgical method because the parents and also the child will be pleased with the result obtained. The crowns now appear at their full length, and what is of special value, the decalcified zones will now cease in their development on account of the elimination of the stagnation area. This constitutes an easy method of preventing formation of cavities.

SUMMARY

The aims of treatment for young patients can be summarized as follows:—

1. To conserve the deciduous teeth through their normal functional period, in such a way that pulp treatments or a premature loss of teeth are avoided.

2. To conserve the permanent teeth throughout life avoiding pulp treatments and loss of teeth. (The third molar is the only exception. It is frequently an advantage to have this tooth extracted.)

3. An optimal tooth position.

Whether these aims can ever be realized I will not dicuss here, but as a concluding remark I will say that a dental surgeon, either a private practitioner or one engaged on the public health service, must be on guard against the tendency, as we have often seen, to have his standard of treatment too much influenced by so-called "social indications".

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AN ORTHODONTIC BAND STRETCHER

By C. C. KNOWLES, B.D.S., D.D.O.
Lecturer in Orthodontics, Liverpool Dental School

THE instrument illustrated (*Fig.* 1) was originally intended to overcome the occasional difficulty experienced in fitting a loop band where a little excess overlapping at the joint had rendered it too tight. After some experience in the use of the stretcher, it was found that the fit of loop bands enlarged in this way was invariably superior to the fit of bands that had not required enlarging. Two reasons for this observation are suggested. One is that some contour is introduced into the band material by virtue of the shape of the heads (*Fig.* 2), and the other that stretching the metal-work hardens it considerably. Such a band, therefore, is less easily deformed because it is harder, and will spring more easily over the greater curvature of the tooth.

In the light of this experience all molar and premolar bands used in the Department are now made deliberately a little too small by increasing by about 0·5 mm. the amount of overlap at the seam at the time of welding.

After welding the seam, the distocervical margin of the band may be festooned before or after stretching, but before the band is driven home on the tooth. This is advised in order to avoid causing any undue damage to the distal gingival attachment when the tooth to be banded is the last molar of the series. The distocervical edge is also cut away sufficiently to prevent the band from projecting below the greatest diameter of the crown in this area. As the band is already contoured, it is not often found necessary to slit and overlap at the mesial or mesiolingual cervical

edge of molar bands. Furthermore, fewer bands need slitting and overlapping at the occlusal edge as is recommended when following the technique described by Friel and McKeag. (1939). It is still necessary, however, to contour all around the gingival edge in order to eliminate any space between this edge and the tooth.

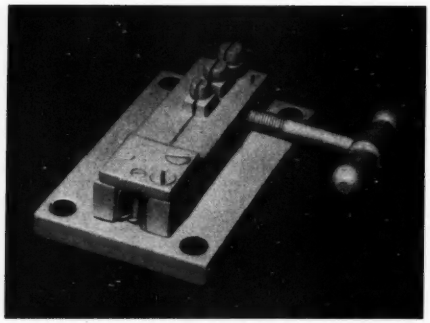

Fig. 1.—General view of band stretcher.

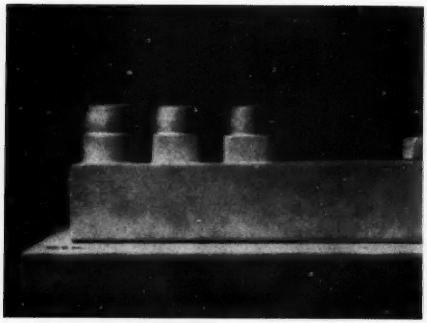

Fig. 2.—The heads are shaped to introduce some contour into the band during stretching.

As the greatest amount of stretching of the metal occurs opposite the gap between the heads as they are opened, care should be taken to rotate the band on the head in between each movement of the screw so that a fresh length of metal is placed across the gap—this ensures that no part of the band is made unduly thin. The screw should turn through about 20° each time. Either the whole width or only the cervical or the occlusal edge may be stretched, depending upon how the band is placed on the head.

Design and construction were carried out in the workshop of the Orthodontic Department and the instrument is made in steel throughout, with the exception of the base and the top plate which are in brass. A stainless-steel spring is incorporated to close the jaws after use. The actuating screw is $\frac{1}{4}$ in. in diameter and carries a British Standard fine thread which was chosen to give a small amount of jaw opening in relation to the number of turns of the screw. Whitworth thread was proved to be too coarse when tried out on a prototype.

In order to determine the three sizes of head, mesiodistal and buccolingual measurements were made of the diameters of upper and lower first permanent molars, second deciduous molars, and premolars. The averages of these three sets of figures were taken before turning down the heads to size. In spite of the considerable difference in the size and shape of teeth encountered, no difficulty has, as yet, been experienced in the use of the instrument, which has been in service for the past two years.

The author wishes to thank Professor H. H. Stones for permission to publish this communication and to express his appreciation of the encouragement given by the members of the Orthodontic Department which stimulated the design of the instrument. Thanks are also expressed to Mr. S. Bailie, of the Photographic Department, for his excellent handling of a difficult subject.

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Amalgam in Pedodontics

Properly constructed silver amalgam fillings are the restorations of choice in the deciduous dentition. Ordinarily it takes little more time to do a good amalgam filling than one that will fail. A routine method for children is outlined.—KULSTAD, H. M., *J. Dent. Child*, **22**, 170.

A SYRINGE FOR RUBBER-BASE AND SILICONE IMPRESSION MATERIAL

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WITH the advent of each new material in dentistry, a great number of instruments and techniques are devised to be used with it. The rubber-base and silicone impression materials are no exception. Indeed, like the hydrocolloids and alginates, their incompressibility has provided new problems in impression taking. Not the least of these is the difficulty of directing it into the base of cavities, of which the impression is required without air blows. Various devices have been used without great success. The "jiffy tube" is messy and unwieldy in the back of the mouth; the hydrocolloid syringe impossible to clean after use, and the cartridge syringe and large bore needle present problems in "time and motion". A special syringe has therefore been designed to overcome these difficulties.

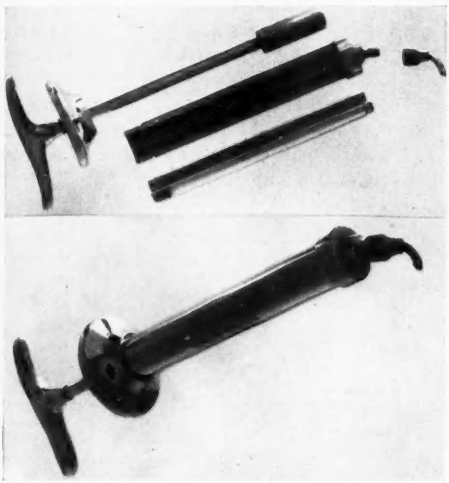

Fig. 1.—A, The split-barrel syringe opened to show the various parts. B, The assembled syringe.

THE SPLIT-BARREL SYRINGE

This consists of a syringe with a split barrel held together by a locking nut and flange. The design can best be understood by examining the accompanying photographs (*Fig.* 1). The barrel halves have a precision fit, and the curved nozzle screws on a little off-centre to permit a clear view of the ejection of the material. The nozzle opening is 1½ mm. in diameter.

Manipulation.—When filling the syringe, it is usually only necessary to pack about an inch of the material in the nozzle half barrel. This is sufficient for most cases. A greater amount may be used but because of the hydraulic problems associated with plungers, there is a tendency for some escape of material from the barrel.

Cleaning.—Immediately after use, the syringe is easily dismantled and the material allowed to set. Afterwards it is a simple matter to rub out the remains and to pass a stylet through the nozzle.

The Detection and Estimation of Residual Monomer in Polymethyl Methacrylate

The suggestion that residual methyl methacrylate in the denture base following incomplete polymerization may be a cause of denture sore mouth prompted this investigation. Qualitative and quantitative tests carried out point to the conclusion that the total residual methyl methacrylate may be considered as the sum of two parts, one part being extractable by water and the other not. This residual monomer affects the strength of the denture and the irritability of the material, the latter effect being thought to be due to the water extractable part of the monomer. The permanganate test shows that this is leached out quite readily, and the authors are of the opinion that the usual time incidence of denture sore mouth after insertion appears to rule out residual monomer as an irritant agent.—SMITH, D. C., and BAINS, M. E. D. (1956), *J. dent. Res.*, **35**, 16.

HYPERPLASIAS, EPULIDES, OSTEOCLASTOMATA

A RADIOLOGICAL STUDY

By **SYDNEY BLACKMAN**, L.R.C.P., M.R.C.S., D.M.R.E.
Director, X-Ray Department, Royal Dental Hospital, London

SWELLINGS found inside the mouth may be hard or soft in consistency and, apart from congenital malformations, are either inflammatory in origin or are shown by the histopathologist to be of neoplastic formation. In some cases even the latter may have an innate inflammatory basis.

As localized swellings, they may be sessile or pedunculated, painful or painless, and are rarely seen from the outside of the face. Attention is often drawn to their presence when there is an interference with the patient's speech or mastication, or when bleeding or ulceration of the gums takes place, or from the coexistence of external manifestations of an intra-oral infection in the form of facial cellulitis or adenitis.

A detailed history, together with a full clinical examination, will often indicate the nature of the lesion, but in all cases it is advisable to seek supplementary radiographic evidence. However, the ultimate diagnosis cannot be determined without a biopsy and an histological examination: occasionally, an innocent-looking soft swelling of the gums is found on microscopical investigation to be a malignant growth.

The nomenclature of the swellings of the oral cavity arising from the gingivæ may be somewhat confusing as the term "epulis" is loosely applied to them all. So many of them are simply fibrous masses and do not behave as true tumours, as they are actually local overgrowths of the gums and composed of organized chronic inflammatory granulation tissue.

As granulation tissue formations are usually of long duration, the terminology "hyperplasias" is an apt description and these lesions may be widespread along the upper and lower jaws, or be localized to a limited area on the alveolar margin. In the latter variety the hyperplasia may be found frequently as a pedunculated, globular lump which has developed excess granulation tissue, and because of its origin and composition has been described by Thoma as a "granulomatous epulis".

These granulomatous epulides are most common formations in the mouth and, if of long standing, tend to lose their inflammatory cells and be replaced by an increased production of collagen fibres. Being composed of layers of loosely arranged mature fibrous tissue, the obvious nomenclature is that of "fibrous epulides", and with this appellation the true pathogenesis of the swellings is maintained as inflammatory overgrowths and not neoplasms.

The term "fibrous epulis" is still used to describe the peripheral fibroma which is a well-defined benign tumour and not an inflammatory lesion. The fibroma arises from the deep layers of the mucosa, the periodontal membrane, or from the periosteum of the mandible or maxilla, and not from the gingivæ. Also, it should be noted that whereas ossification and calcification may be observed in the peripheral fibromata, these changes do not occur in the inflammatory epulides. It would seem, therefore, that a fair compromise in terminology might be made and one might allude to the fibroma as a "fibroid epulis".

In the recognized cases of hyperplasias, unless the spread of the disease extends to the bone structure beneath the gums, there will be no radiographic signs of any abnormal changes in the bone supporting framework of the teeth. When the marginal periodontal membrane becomes involved, changes may occur in the alveolar process along its free edge, embracing the bony interdental regions and the tooth-sockets themselves. In such circumstances, the X-ray picture will reveal

erosion, destruction, and resorption of the underlying osseous structure.

Many of the hyperplasias of the gingivæ are sessile tumour-like tissue masses, localized to a limited region in the upper or lower jaws along the alveolar borders, but in a large

Fig. 1.—Gingival hyperplasia. Lobulated, red, ulcerative, localized, sessile mass in $\underline{1|1}$ region, simulating an epulis. Male, aged 54, with generalized inflammatory hypertrophy of the gums.

number of cases, especially in the older patient or when the condition is of long standing, the involvement of the gums is more widespread. Whether the lesion is localized or extensive in distribution, the area affected is that part of the gingiva overlying the cervical portion of the tooth and the interproximal spaces on one or both sides of it (*Fig.* 1).

Radiographically (*Fig.* 2), the free alveolar margin of the affected area exhibits an irregular concave edge due to erosion and destruction of the bone. Local resorption and recession of the proximal part of the socket may ensue, spreading towards the apex of the tooth which may become totally denuded of its bony support. If the inflammatory process persists, the bone beyond the actual free margin may show progressive rarefaction. In the more generalized hyperplasias where the areas involved are widespread, the appearances on the X-ray films cover two or more sockets with their bony interdental septa and may be seen in both the upper and lower jaws of the same patient.

Unless there is concurrent coronal disease, there should be no thickening or irregularity of the periodontal membrane shadow around the teeth. The loss of the supporting bone structure by resorption produces a loosening of the teeth in their sockets and, in so doing, allows the teeth to incline and tilt away from their vertical axis to become impacted against neighbouring standing teeth, or overlie an

Fig. 2.—Radiograph of *Fig.* 1. Irregular erosion and destruction of the alveolar margin around the proximal part of $\underline{1|}$ socket with recession of the bony interdental septum between the central incisors. Rarefaction of the main alveolar process. Slight separation of the crowns of the upper central teeth. No pivotal divarication.

edentulous region. This feature is in distinct contrast to the sequence of events provoked by the benign new growth formations which, by their size and position, tend to separate the crowns of the teeth through their growing bulky mass—and not because the roots have lost their osseous support.

Another important characteristic of the hyperplasias is that although after some time there may be much loss in the cellular elements of the inflammatory mass with marked fibroblastic production, yet there is no such change as calcification or ossification taking place within the inflamed overgrowth of tissue. This trait distinguishes the hyperplastic formation from a fibroma which may undergo ossification.

The true growths, benign and malignant, arise from any of the constituent tissue formations found in the mouth, whether soft tissue

or bone, and an X-ray examination of the regions from where these entities arise may provide information, direct or indirect, towards the ultimate diagnosis of the swellings. Soft-tissue growths do not cast shadows on an X-ray film unless the mass is situated peripherally or a low penetration X-ray beam is employed. Then the outline and contour of the enlargement may be demonstrated, showing whether the tumour is overlying the crowns of the teeth, separating them or actually eroding them.

Although there may be no definite shadow cast by the soft-tissue growth on account of its lack of density, nevertheless the X-ray picture often reveals the presence of a number of small and irregular-shaped opacities *within* the area of the tumour, and these millet-seed-like deposits have no connexion with the main bone structure surrounding the swelling. This

Fig. 3.—Ossifying fibroma. Numerous small irregular-shaped opacities within the translucent area of the epulis. Marked displacement of the canine tooth from the first lower right molar tooth.

Fig. 5.—Fibroid epulis. Avascular, hard, sessile epulis lying on the buccal aspect. Separation of the crowns of $\overline{2}$ and $\overline{3}$ with widening of the proximal part of the bony interdental septum, with a concave summit. Rarefaction of the interproximal bone due to pressure atrophy.

Fig. 4.—Melanoma in the $\overline{321}$ region. No structural changes seen in the radiograph.

Fig. 6.—Fibroid epulis. Widening and flattening of the summit of the bony interdental septum between the left central and lateral incisor teeth in the lower jaw. Marked pivotal divarication of the crowns of the teeth.

composite image provides evidence of the existence of a fibroma in which changes of calcification and ossification are taking place, and this entity is termed an "ossifying fibroma" (*Fig.* 3).

This latter term is also applied to another form of epulis into the substance of which a

From the radiographic viewpoint, interest lies mainly with those fibromata which are situated along the alveolar margin, and a review has been made of 148 cases which were sent to the X-ray department of the Royal Dental Hospital, London, during the past four years, with a clinical diagnosis of "epulis".

Fig. 7.—Fibroid epulis. Firm, nodular, sessile, symptomless swelling. Female, aged 56 years.

Fig. 8.—Radiograph of *Fig.* 7. Broadening of the bony interdental septum. Wide separation of the crowns of the lower left premolar teeth, with pivotal divarication and tilting of the second bicuspid.

Fig. 9.—Fibroid epulis. Recurred within two years after excision. Histological report: Ossifying fibroma. Female aged 32 years.

Fig. 10.—Radiograph of *Fig.* 9. Bony spur from free alveolar margin extending into soft mass of the epulis, with divarication of the teeth.

bony spur or spicules of bone extend arising from the margin of the free surface of the mandible or maxilla (*Figs.* 8, 10). There is some doubt as to whether these conditions, the mottled growth and the sprocketted lump, should be classified as identical entities, i.e., ossifying fibromata: neither their origin nor histopathology are in fact the same, and the latter type calls for a more radical surgical procedure to prevent a recurrence of the growth.

Each of these patients was submitted to an intra-oral examination of the teeth and every specimen after removal was sectioned and investigated histologically, and of these 101 were found to be inflammatory hyperplasias with a preponderance of fibroblasts, i.e., fibrous epulides.

Eighty-two of the hyperplasias were relatively small and pedunculated, with no evidence of marginal periodontitis in either

jaw and presented no radiographic signs of their existence. The other 19 were associated with inflammation of the gums in the upper or lower jaws, were most sessile, varying in size and all with comparatively short histories. The majority of these latter cases showed some

Fig. 11.—Diastema. Abnormal spacing between the upper central incisor teeth. The summit of the bony interdental septum is flattened, but there is no erosion nor resorption. No pivotal divarication of the teeth.

Of the remaining 47 patients, 8 of the specimens were shown histologically to be osteoclastomata or giant-cell epulides, 1 a melanoma, 36 were true benign fibromata or fibroid epulides, and 2 were identified as malignant fibrosarcomata. The only lesion (*Fig.* 4) of this group which was unassociated with any radiographic signs was a melanoma in the $\overline{321}$ region, whilst the X-ray changes in the remaining 36 fibromata were distinctive, varying only in degree.

148 cases
- Inflammatory (101 hyperplasias)
  - 82 Localized swellings
  - 19 Associated with widespread gingivitis
- Non-inflammatory (47 cases)
  - 36 Fibroid epulides (fibromata)
  - 2 Fibrosarcomata
  - 1 Melanoma
  - 8 Giant-cell epulides (osteoclastomata)

Unfortunately it is not possible from the above figures to determine a statistical basis of the precise frequency or ratio-incidence of the different entities. The patients were sent to the X-ray department by practitioners of

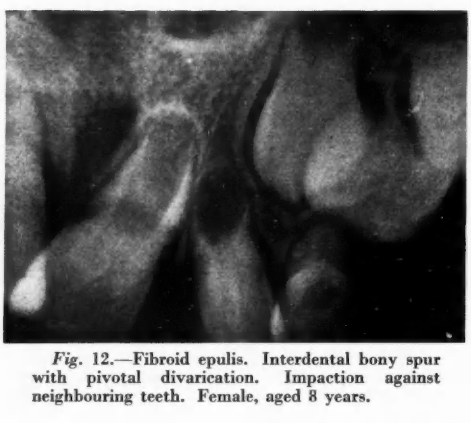

Fig. 12.—Fibroid epulis. Interdental bony spur with pivotal divarication. Impaction against neighbouring teeth. Female, aged 8 years.

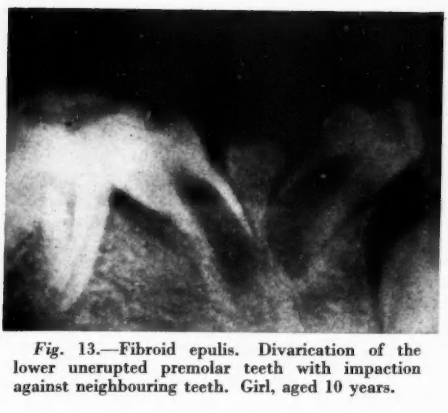

Fig. 13.—Fibroid epulis. Divarication of the lower unerupted premolar teeth with impaction against neighbouring teeth. Girl, aged 10 years.

indication on the X-ray film of destruction of the marginal alveolar bone, ranging from flattening of the summits of the bony interdental septa to gross recession and resorption of the alveolar process.

widely varying seniority and experience, and many cases of clinical hyperplasias, especially of the generalized variety attending the different departments of the hospital, were not referred for radiographic examination.

The actual size of the fibroid epulis seen on the gingival surface does not appear to bear any definite relationship to the extent of the underlying bone changes but, on the other hand, the site of the growth and its duration do seem to play an important role in the production of radiographic signs. When the swelling is confined mainly to the buccal side of the teeth, the X-ray signs are minimal: if, however, the fibroma is closely lodged and wedged between the teeth and at the same time encroaching upon the lingual aspect, the X-ray picture presents reliable direct and indirect evidence of the nature of the lump.

The earliest radiographic sign of a fibroid epulis, with the teeth standing, is a blunting and flattening of the sharp apex of the bony interdental septum, which later is followed by a concave excavation (*Fig.* 5). Erosion and local osseous destruction are not the usual features associated with fibromata: if, however, resorption of the bony dental support is seen in proximity to or beneath a fibroid epulis, it is due probably to pressure atrophy from a growth of long standing. In cases of marginal periodontitis and chronic hyperplasia of the gingivæ, not only is there erosion of the alveolar bone but marked rarefaction of the bony septa around the distal part of the root of the tooth.

In reality, the tendency of the basal bone under the epulis would appear to be towards osteoblastic activity rather than to a destructive reaction, and new bone formation is often seen at the summits of the interdental septa. Reviewing the 36 true benign fibroid epulides in the series under examination, it is possible to discern 4 different forms of new bone formation associated with these growths:—

1. Widening and broadening of the actual free margin of the bony interdental septum with divarication of the teeth (*Fig.* 6).

2. Uniform overgrowth or enlargement of the whole of the interdental septum from cervical margin to apical area, with parallel lateral displacement of the teeth (*Figs.* 7, 8).

3. Spur or spicule formation arising from the free bone margin of the alveolar process and extending into the soft mass of the growth with divarication of the teeth (*Figs.* 10, 12).

4. Calcification and ossification within the growth (*Fig.* 3).

In this group of benign neoplasms there were 25 cases depicting the changes described in the divisions (1, 2) and the remaining 11 conforming to (3): and of the first 25, 4 were observed to undergo changes of ossification. These osteoblastic changes are therefore more common in occurrence than have been commented upon hitherto, but nevertheless not surprising in view of the fact that these fibromata arise from the alveolar dental periosteum.

It may be justifiable to presume that there is some stimulation of the periosteum under the epulis: but it must still be open to conjecture whether a long-standing fibroid epulis promotes a secondary osseous reaction from the periosteum or perhaps the new growth is in fact a fibrogranulomatous mass surrounding and protecting an exostosis.

Whatever may be the ultimate decision as to the exact aetiology of these entities, the resultant mechanical sequence is the same—a separation of the crowns of the adjoining teeth. Here the X-ray picture is of paramount importance, for an image of the full length of the roots will show that the gap between the teeth is a divarication of the teeth themselves, pivoted upon the apices.

The importance of this pivotal divarication cannot be overstressed for it is almost pathognomonic of a fibroid epulis. Spacing between teeth may be produced by many other conditions which, if uncomplicated by any form of gingival hyperplasia, are readily distinguishable. Diastemas (*Fig.* 11) are usually discerned in the adolescent in the upper jaw in the incisor region, and in most instances, associated with hypertrophy of the labial frænum, or may be seen in other regions along the jaws resulting from retained roots, unerupted teeth, or buried odontomes.

Anodontia of genetic origin or a loss of teeth may also be responsible for abnormal spacing, but in these patients the teeth are firmly implanted and the roots maintain their normal vertical position. The gaps seen between the teeth in acromegaly are more obvious on account of their buccoversion from the outward pushing of an enlarged tongue, whilst the

spacing present in dysplasias is correlated with alterations in the density of the main bones.

The separation of the teeth observed in marginal periodontitis is due to the loss and resorption of the supporting alveolar bone, and the teeth themselves become loosened—an

Fig. 14.—Peripheral fibrosarcoma. Marked destruction of the alveolar bone leaving the teeth "floating in the breeze". Parallel separation of the teeth. Male, aged 19 years.

occurrence rare with benign epulides. With the pivotal divarication of the teeth associated with peripheral fibromata, it will be noticed that the crowns of the separated teeth become impacted against their immediate neighbours, a feature which is not present in the foregoing conditions (*Figs.* 12, 13).

The X-ray appearances of sessile fibromata located in edentulous areas appear to vary according to the size and duration of the growths. Small concavities or depressions break the even continuity of the alveolar margin and the radiograph shows single shallow indentations which may grow into larger and deeper beds, but never accompanied by signs of bone destruction. As opposed to the hyperplasias, the gouged-out shadows of these epulides do not stimulate any local bone reaction, either osteoblastic or osteolytic, but retain their clear, sharp, and regular outline with no encompassing condensation of bone or sclerotic deposition.

Fibrosarcomata along the alveolar margin are rare, but in view of their high degree of malignancy, it behoves the radiologist ever to be on the alert in recognizing any abnormality in outline or density of a marginal indentation which might indicate the possibility of the existence of such a growth. Any extension of bone destruction should be carefully followed into the main bone, seeking for a clue as to whether there is a rapid malignant infiltration from a peripheral lesion or whether a central fibrosarcomatous growth is developing a marginal manifestation.

With the uncontrolled increase in size of this type of neoplasm, the standing teeth become loose and gradually separate from their normal vertical alinement and are displaced laterally with a parallel and not a pivotal separation. There is a loss of the surrounding bone structure and of the bone around and beyond the apices—the image on the X-ray film presenting the curious spectacle of unsupported teeth "floating in the breeze" (*Figs.* 14, 15). The base of the destroyed area is grossly irregular, the destruction of the intervening bone between the teeth is marked and is replaced by malignant soft-tissue formation which promotes an outstanding spacing of the teeth and does not cast a shadow on the radiograph.

Fig. 15.—Peripheral fibrosarcoma. The teeth appear unsupported, but still retain their vertical disposition. The irregular destruction of the alveolar bone is marked. Male, aged 55 years.

The activity of the neoplasm is essentially osteolytic (*Fig.* 15) and the area of the growth shows no spur formation, no spiculation, and no deposits of chondrification or ossification. The malignant infiltration is rapid and uneven and the X-ray picture reveals an irregular serrated bone margin penetrating deep into the main bone and often many isolated small bone sequestræ are present in the wake of the invading tumour.

Cases of peripheral fibrosarcomata which escaped recognition in their early stages are eventually identified by their avidity in spreading into their immediate structures, and observers have reported the invasion of such malignant lesions into the inferior dental canal in the lower jaw and into the maxillary sinus in the upper jaw. In the latter condition,

Fig. 16.—Giant-cell epulis. Tense, deep purple swelling overlying the $\overline{b}$. Boy, aged 7 years.

expansion and destruction of the bony walls of the antrum take place, and the writer can recall a malignant epulis which encroached upon and later penetrated into the nasal floor and then into the soft tissues of the face.

The importance of submitting every soft-tissue peripheral growth after excision to a histopathological examination is emphasized by the single case in the series which proved to be a melanoma, although clinically it did not present any difference in appearance from a simple fibroid epulis. The X-ray picture was completely negative, showing no displacement of the teeth, no change in the marginal bone, and no rarefaction or erosion of the bony interdental septa.

Of the 8 osteoclastomata included in this survey, all were peripheral in position and 6 were found in children under 12 years of age, 3 boys and 3 girls, and the other 2 were female patients, 41 and 45 years old. It is only in recent years that these growths have received their correct histological recognition as peripheral giant-cell epulides. Such terminology as myeloid epulis or myeloid sarcoma is not justified as these neoplasms do not arise from myelogenous tissue or bone-marrow cells. They originate in the alveolar dental periosteum which is osteoblastic tissue and from which the tumours grow as a result of excess activity of normal bone-forming function.

In describing these formations as giant-cell epulides, it is implied that they are benign giant-cell tumours situated on the alveolar

Fig. 17.—Radiograph of *Fig.* 16. Spiculated bone prolongations into the substance of the tumour radiating from the summit of the interdental septum between the lower left incisors, into a pseudo-like cystic area. Resorption of the apex of the $\overline{b}$ and of the mesial part of the root of $\overline{c}$.

margin as solitary lesions and in no way associated with such similar growths seen in conditions like osteitis fibrosa. Fundamentally, these neoplasms are benign although a number of them do recur after surgical removal: they are seldom malignant in the sense that they endanger the life of the patient or form metastases.

So many of these tumours occur in children during the period of dentition and they have been classified as odontoclastomata. They present X-ray appearances sufficiently definite to differentiate them from those growths seen in the older patient.

A small boy aged 7 years attended the Royal Dental Hospital with a painless swelling (*Fig.* 16) in the lower left incisor region with a history of about six months' duration. On examination, the lump was seen on the buccal

aspect of the lower left incisor teeth, deep purple in colour, about the size of a small hazel nut, and tense in structure. The radiograph (*Fig.* 17) shows a partially erupted lower first left incisor tooth with the lateral incisor, the canine and first premolar tooth unerupted.

Fig. 18.—Giant-cell epulis. Painless swelling on buccal aspect of 23 region, spreading to the alveolar ridge and separating the teeth. Girl, aged 12 years.

Fig. 19.—Radiograph of *Fig.* 18. Coronal divarication of the lower left lateral incisor and canine teeth, with total loss of the interdental bony structure.

The first deciduous tooth has been shed, but the $\overline{b}$ and $\overline{c}$ display evidence of resorption of their roots in the form of an arc and appear to be riding on the periphery of a cyst. Between the lower central incisor and the lateral tooth, the bony interdental septum is broadened at its summit with radiating spiculations of bone arising from it and fanning upwards and outwards into the substance of the tumour. The lateral incisor is displaced laterally and is impacted against the unerupted canine.

In another case of a giant-cell epulis, the mother of a girl of 12 years of age stated that she had noticed that for nearly 4 months there

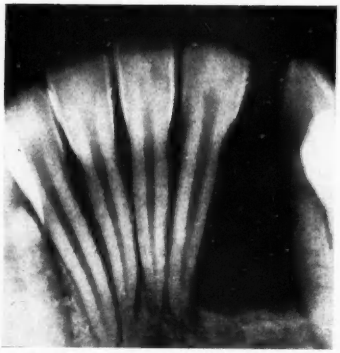

Fig. 20.—Giant-cell epulis. Large, smooth, sessile growth overlying the teeth on the buccal surface. Cystic in appearance, but no fluctuation. Female, aged 45 years.

Fig. 21.—Radiograph of *Fig.* 20. Recession and resorption of the alveolar bone margin. No separation of the teeth.

was an increasing gap between the lower left lateral and canine teeth of her small daughter. The child had not complained of any pain or discomfort in this area and no swelling was noticed until two or three weeks previously. On examination, the lump was purplish in colour, vascular in appearance, firm to the touch, not

tender on palpation, but the bounding teeth were unusually loose.

The radiograph (*Fig.* 19) is instructive in that there is an inverted or coronal divarication of the teeth with a wide separation of the roots and apices of the lateral incisor and canine teeth. The whole of the bony interdental septum and the alveolar osseous support of these teeth have been destroyed, there is no sign of any new bone formation within the soft-tissue mass, and the growth is lying in a deep, scooped-out hollow excavation or bed. Although there was no apparent outward manifestation until the last two or three weeks, the tumour had been present and growing insidiously for a long period, with a slow but gradual displacement of the teeth and a pressure erosion of the bony septum.

The six peripheral giant-cell epulides which were found in the children in this series were all located in the incisor-canine region, four in the lower jaw and two in the upper; all were sessile and tense, none was large in size, and the contour of each was irregular. The long bones of three of the children were radiographed but no other associated lesions were seen.

The peripheral osteoclastomata in the two female patients were sited in the lower central incisor region and the upper left premolar region, respectively. In both cases the history extended over six months, they were large smooth growths and not nodular, horizontally ovoid in shape, placed sessile on the buccal surface of the alveolar process and firm to the touch. There was no separation of the crowns of the teeth.

The tumour in *Fig.* 20 appears to spring from the gingiva near the cervical part of the teeth and is overlying the crowns; it has a remarkably smooth surface and is almost cystic in appearance. The patient herself volunteered the information that although there was no pain in and around the lump, she was of opinion that it was "gathering abscess" and that she expected it either to burst or disperse.

The teeth showed no signs of caries, there was no history of trauma and they were not loose. Blood-chemistry determinations were carried out in both cases to exclude the possibility of hyperparathyroid disease, but there were no changes in the blood-phosphorus and blood-calcium levels. Radiographic examination revealed no evidence of fibrocystic lesions of the other bones of the body.

The radiograph (*Fig.* 21) provided but little assistance. The only abnormal feature is the recession and resorption of the alveolar bone margin. The neoplasm is not interdental in position and therefore there is no separation or displacement of the teeth.

The majority of cases of giant-cell epulides are met with in early life during the period of dentition and present definite radiographic signs of bone loss and tooth displacement: those tumours observed in later life do not exhibit any marked changes in the X-ray picture.

Acknowledgements.—I am most indebted to my colleagues at the Royal Dental Hospital, London, for their permission to follow up their cases and to our Photographic Department for the excellent prints and reproductions.

Quantitative Evaluation of the Effect of Toothbrushing and Toothpicking

Six ccs. of saliva were collected from 4 persons aged between 27–48 before oral hygiene, during toothbrushing, during toothpicking and after oral hygiene.

The samples were kept at 37° C., stirred in a beaker until the excess carbon dioxide had escaped, and the *p*H assured after the addition of 1 c.c. of a 50 per cent glucose solution to 5 c.c. samples after ½, 1, 2, 3, and 4 hours. A rapid drop in *p*H was observed in both the toothbrushing and the toothpicking samples, it being greater in the former.

It is therefore concluded that the main part of the bacterial plaque can be removed from the teeth by brushing, but that which remains in inaccessible areas can only be removed by the toothpick or dental floss. The amount of bacterial plaque accumulated on the teeth is to a certain extent proportional to the length of time without oral hygiene, and the authors recommend that the teeth should be brushed twice daily and toothpicked once.—MORCH, T., and WAERHAUG, J. (1956), *J. Peridont.*, **27**, 183.

IMMEDIATE TORSION: A PRELIMINARY REPORT ON TWENTY-THREE CASES*

By **Prof. G. E. M. HALLETT**

THE history of the surgical correction of single-rooted teeth goes back a long way. Fauchard and John Hunter and many others experimented with replantation, and transplantation of vital teeth was not at all uncommon. However, on occasion more than the tooth was transplanted to the discomfort of both patient and operator, and the application of transplantation fell into disuse.

In 1865 in a letter from John Tomes to a Dr. McQuillen of Philadelphia Tomes commented on the fact that he had noticed little in American publications of an operation which is "now becoming common in England, the twisting of teeth in their sockets then and there with a pair of forceps for the purpose of correcting irregularity of position". He goes on to say: "I have frequently performed this operation in children up to the age even of 13 years, sometimes operating upon 2 teeth on the same occasion and up to the present time I have not lost a tooth."

In 1881 Coleman refers to the rotation of teeth, or immediate torsion, and protests against the practice of this method on the grounds that the tooth is liable to lose its vitality. He was evidently prejudiced against this form of treatment, having as he says "recently removed a necrosed right upper lateral tooth which had been thus rotated; yet the eminence of the operator was a guarantee that the operation had been most carefully performed". He goes on to say that the tooth had never come down to proper length, was dark in colour, and more than half of it was resorbed.

Towards the turn of the century Sidney Spokes (1894) was a great advocate of surgical luxation of teeth which involved moving teeth from a palatal to labial inclination by means of forceps. This was a method which was widely used by himself, by Bryan of Basle, by Dolomore and others, but torsion was considered to be a rather more hazardous method than axial luxation.

Cunningham (1893, 1894) says that "although a certain number of teeth may have been lost by putrefaction of the pulp following upon forcible rotation there is ample evidence that the operation has been successful in a sufficient number of cases to warrant the operator continuing the practice and under such circumstances as the patient being unwilling or unable to undergo the slower but more certain method of rotation by mechanical appliance".

J. F. Colyer in 1900 deals at some length in his notes on irregularities of the teeth with immediate torsion, quoting such disadvantages as liability of the tooth to leave the socket—the risk of death to the palatal vessels from strangulation—fracture of the enamel, and fracture of the root. He suggests that torsion should not be done after the age of 10 but goes on to suggest that it is a reasonable method of treatment in certain circumstances. He then describes 3 cases involving central incisors, 2 of which were rotated through 45° and 1 through 90°; the model of the latter case made 6 years after treatment is illustrated. No further details of these cases were given and no roentgenograms were shown. Neither the patho-histological reactions nor the clinical reactions to vitality tests seem to have been discussed.

Later Tomes discussed again the operation of immediate torsion (Tomes and Newell, 1906). The most favourable age for its performance he thought should be about "9 or 10 years, when the teeth are fully erupted, but when their sockets had not yet attained full strength". This is a significant point to which I shall refer later. Tomes goes on to say that the authors have successfully "twisted central incisors in patients as old as 15 years of age and in several

* Read at the meeting of the British Society for the Study of Orthodontics held at Newcastle upon Tyne on Friday, May 11, 1956.

instances in patients aged 13" but he preferred to do it at the younger age. He suggested also that it may be necessary to twist the tooth somewhat farther than is required owing to its tendency to spring back somewhat to its original position. He says that in "several instances thoroughly satisfactory results have been obtained where the tooth needs to be turned through 90° by turning it through only half the required distance, allowing it to get firm again and then after a lapse of a fortnight or three weeks completing the operation by twisting it through the remaining distance. Although on the first occasion the resistance may have been very great the tooth generally yields readily to the second attempt." He considered such a course preferable to the use of great force in order to complete the operation at the first attempt.

We now move on to 1921 when Bocquet-Bull addressed the British Society for the Study of Orthodontics in November and reported upon 8 cases of immediate torsion (1922 a, b). Bocquet-Bull quoted Tomes and Dolomore and Spokes, but said that he was unable to trace any reports of this method being used by anyone else in the country at that time. He considered the dangers associated with immediate torsion to be largely illusory providing cases were selected carefully. After giving an account of his method of turning the tooth, which does not differ substantially from the previous and older described methods, he gave an account of his cases. Now the interesting thing about these cases is that only one is illustrated by roentgenograms and models and it is not clear to which case it refers. It concerns the immediate torsion of an upper central incisor but 4 cases are reported in all. In the first roentgenogram the apex appears slightly open with the root well formed. After rotation, where the splint may be seen in situ the apex seems almost complete. This is because a different view has now been taken of the tooth; a not uncommon finding. In the third roentgenogram there is a suggestion of an area about the apex; the fourth roentgenogram is a poor one but the tooth seems satisfactory and one can see lamina dura medially. From the first model there would not appear to be room to turn the tooth, but the treated condition in the second illustration shows that this in fact had been done. It is interesting to note, too, in this second illustration that the upper canines are completely blocked out. Bocquet-Bull apologized for the lack of illustrations and records which he blamed upon hospital methods and lack of facilities for storage, care, and supervision of them. It is possible that he showed a few more cases than appeared in this article. The duration over which the cases were reported is not very long. The longest concerned 2 reported after a year—1 reported after 8 months, 1 after 6½ months, 1 after 5½ months, 1 after 5 months, and 2 others which apparently died shortly after operation. A lively discussion seems to have followed the communication of Bocquet-Bull. The President said that he had done some immediate regulations by alveolotomy in the manner of Dolomore and Spokes. He thought that failure in alveolotomy was less than in immediate torsion.

St. J. Steadman thought that the incidence of dead teeth obtained by this method over the past 10 years had been too high. He also said that in his experience the tooth remained permanently tender after the operation. He thought driving of the forceps under the gums very undesirable and he personally would not follow the method. Dowsett criticized the method and thought that part of the periodontal membrane must necessarily be degenerate because its tissues have been severed. He said, very wisely, that he would like to see the records of these cases in 1941 and not in 1921 and he was against the method on the present very limited records of established recorded cases.

Pitts referred to Hopewell-Smith who, he said, used frequently to move teeth by immediate methods. Pitts had done a few cases himself and found them, so far, to be satisfactory. He felt strongly that the blades of the forceps should not go below the gum margin. He usually operated under local anæsthesia. He thought the chances of success were greater with the very young tooth but that the risk of dilaceration was higher, but

he thought that might not really matter. He thought that in order to arrive at a correct conclusion there should be a long series of recorded cases over a considerable period. He himself actually proposed to do some more.

Spokes had done a few cases but was not satisfied with the results and he was inclined to fight shy of the method, though he was whole-heartedly in favour of luxating the teeth over the bite, which he thought on the basis of over a hundred unrecorded cases the simplest and safest of all methods.

Later, in 1933, Bocquet-Bull reported a case of immediate torsion involving secondary orthodontic treatment. Unfortunately original models were lost and not shown. The tooth had been rotated and splinted and the radiograph shows the root only half-formed and the pulp canal widely open at the time of operation. This appears to have been one of the original cases reported to the British Society for the Study of Orthodontics in 1921, but much essential information is missing. In fact, the original date of the operation is not given. Final roentgenograms show that the apex was normal in the new position and he reported vitality to be fully maintained. Interesting points that he made were:—

1. The reluctance of the tooth under efficient orthodontic treatment to move suggesting that some fibrosis of the periodontal membrane had probably taken place.

2. The development of the root after immediate torsion.

3. The method used in drawing the tooth into a normal position.

4. The vitality of the pulp 4 years after the original operation.

Although Cutler had made vitality tests on this tooth and said that he had used hot gutta-percha and ethyl-chloride with success, finding the vitality to be the same as that of adjoining teeth, Visick pointed out that the pulp chamber seemed to be abnormal and almost obliterated and the President hoped that Bocquet-Bull would be able to report on this tooth in 3 or 4 years time. He said that he himself had a similar case which he had reported and that the follow-up condition was not available at least 10 years after the original operation.

In 1950 A. D. McAlister reported a case of immediate torsion in a girl of 7 who was suffering from a cleft palate and who had been operated upon at 3 months of age. The tooth, 1 month later, was reported to be in good position and reasonably firm in its socket. He comments that rotation of the tooth had corrected a speech defect. In the *Year Book of Dentistry*, commenting on this case the editor says follow-up examinations of vitality of the tooth in this case and in similar cases over a period of years is indicated to establish the merit of this procedure. My own feeling is that it is quite ridiculous to report cases so shortly after operation and that by doing so dentists are exposing themselves to criticism and gaining nothing for the establishment of any method of treatment.

Also in New Zealand in 1950 Professor Pickerill commented on the use of immediate orthodontics (usually by immediate torsion) in cleft palate cases. He thinks that this is a useful and justifiable method but does not quote any particular cases.

And so we come up to the present time. I have thought it important briefly to sketch over the history of immediate torsion in order to put the problem in some sort of perspective. There has been a tendency, of course, for the method to fall out of use and for it to be mentioned less and less in the standard textbooks. The later editions of Widdowson, Colyer, and Sprawson still include it and Colyer and Sprawson give a fairly detailed account of its employment.

Why does the method of immediate torsion carry any attraction? Firstly, and naturally of course, there is the immediacy that is implicit in its description. It is always preferable to get an unsightly and badly rotated tooth corrected quickly and with the minimum of fuss if there are no other drawbacks. The æsthetic improvement is manifest in 3 weeks or less according to how long a splint is kept in position. There is no tendency to a relapse to the former position, and finally there is practically no discomfort from the patient's point of view. If slow or appliance correction were easy to

accomplish there would be no reason to contemplate the surgical method, but rotating single-rooted teeth is not always easy and can all too often be very difficult indeed. The more the rotation the greater the problem and the more slowly must it be accomplished. Once achieved, there is a strong tendency to relapse, which means that the tooth must be retained for a very considerable time. Removable appliances which look all very well on paper and in theory, are often disappointing in the mouth because of retention and the problem of applying correcting forces precisely to the inclined planes of the tooth crown. Rotation of multirooted teeth is much more simple but the problem is essentially a different one. Here the roots are moved bodily within the bone and even oval shaped roots are easier because definite areas of pressure and tension are developed (*Fig.* 1 A, B). But in torsion of single near-conical roots, areas of pressure are not well developed. The whole periodontal membrane is put into a state of similar strain (*Fig.* 1 C) which causes reaction, inflammation, and, if the forces are severe, supra-occlusion of the tooth because of general inflammatory changes. Why the tooth should so persistently tend to relapse is not yet clear, but it may be that the socket is not completely remoulded to the tooth in its new position as occurs in axial movements in teeth. It would take some prolonged animal experiments to settle this point, but it is not easy to find an animal with suitable teeth—that is to say with straight conical roots and adequate crowns for the supporting of bands and cleats. Monkey incisors for example have a very pronounced curve in their roots.

Now immediate torsion is probably a matter of autogenous replantation with the tooth never leaving the socket. This is, of course, a slightly paradoxical way of putting the matter but it is, I think, accurate. I very much doubt whether there is any actual twisting of the afferent or efferent vessels; they probably all rupture along the lenticular boundary of the epithelial diaphragm (*Fig.* 2 a, b) and then rapid healing with revascularization ensues.

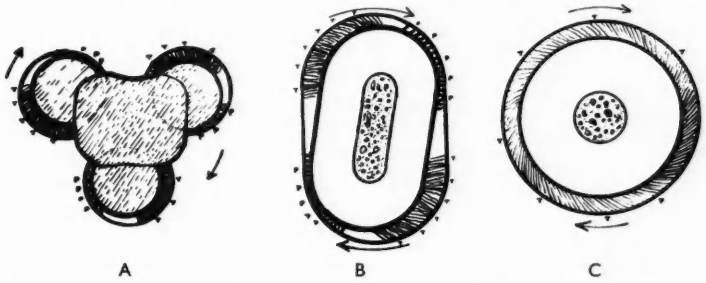

Fig. 1.—Illustrates the difference in the problem of rotating. A, Multirooted tooth, e.g., upper molar. Pressure and tension areas; B, Elliptical cross-section root, e.g., premolar or canine. Pressure and tension areas; C, Cross-section of circular root, e.g., maxillary incisor. Tension areas only.

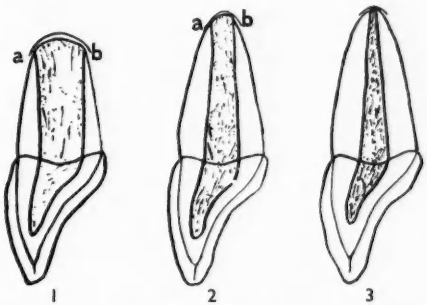

Fig. 2.—Showing a–b, varying width of lenticular boundary of epithelial diaphragm.

There is a minimum of sepsis because the tooth never leaves the socket and therefore healing conditions are at an optimum. We all know that extracted teeth, if replaced, can in a small number of cases give long service to their owners. Mostly they show either slow or galloping resorption, but in a few it becomes

almost impossible to detect that the tooth was ever parted from its socket. The reacceptance by the body of its own tissues either reimplanted or transplanted is always a matter of great surgical interest, as is the acceptance of grafts and implants of heterogenous origin, and the plastic and ophthalmic surgeon continue to persuade the body to accept a variety of materials in place of the natural tissues such as orlon, nylon, acrylic, tantalum, stainless steel. The turning of a tooth within its own socket is surely worth serious investigation.

To be continued.

LETTER TO THE EDITOR

Sept. 24, 1956.

Dear Sir,

I have read Mr. Norman Wild's article on "Fistulæ of the Lips" with great interest, but feel that I have to comment on it.

First of all, I wish to refer to my papers (1) (2) which deal exhaustively with the aetiology and pathology of fistulæ of the lower lip.

It has been proved by our research work that the formation of the fistulæ of the lower lip is not caused by "imbalance of growth of the embryonic lip", but is the result of *arrested development* as it is the case in cleft palate and hare-lip.

On slides made from the mandible of human embryos of 5·2–9·2 mm. maximal length one can see on the originally uniform mandible a formation of grooves caused by the downgrowth of epithelium, a median one and two lateral ones as well as a horizontal one on each side, which all normally disappear gradually. Should the median groove fail to fuse, the very rare median mandibular cleft is the result. Should the lateral grooves fail to fuse, we find the so-called fistulæ of the lower lip. Normally this fusion takes place at the same time as the fusion of the frontonasal and maxillary process.

The close connexion between the pathogenesis of the fistulæ of the lower lip and the pathogenesis of hare-lip and cleft palate seems, therefore, to be quite evident. But we have not only observed cases with arrest of ontogenetic development, but also cases with arrest of phylogenetic development where syndactyly, web- and club-foot, accessory mammillæ, hermaphroditism, etc., were simultaneously present.

In none of our cases could similar fistulæ of the upper lip be found.

An interesting point which I would like to mention only very briefly is that there is a possibility that the downgrowth of epithelium in the embryonic human mandible is a residue of mucous glands, as we find in sharks (Keith).

Yours sincerely,

L. POHL.

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The Use of the Minnesota Multiphasic Personality Inventory as a Diagnostic Aid in Periodontal Disease—a Preliminary Report

THE Minnesota multiphasic personality inventory (M.M.P.I.) is a means of assessing the psychic state and its attendant homeostatic relationship.

Analysis of 50 patients chosen at random, all of whom had periodontal disease, revealed a median score, lower than that of a psychiatric group, but higher than that of groups of students at Iowa State University and New York University.

The correlation between the rapidity of bone loss and the degree of anxiety was questioned, and although this is only a preliminary investigation, it is considered there is sufficient evidence to show the positive correlation between the anxiety state and periodontal disease.—MILLER, S. C., THALLER, J. L., and SOBERMAN, A. (1956), *J. Periodont.*, **27**, 44.

ENJOYING THE CHILD PATIENT*

By EUGENE J. NORTH, D.D.S., *Buffalo*

THE subject "Enjoying the Child Patient" is a many-faceted one and to discuss all of its various aspects would take considerably more time than is possible in this presentation. Therefore I shall attempt to take up only two aspects of the subject which seem to me to be perhaps the most crucial.

There is no question but that if we are to enjoy any phase of our work, *we must understand its position of relative importance and overall need.* Although dentistry for children is a comparatively new branch of our profession, enough has been done in the field during the past twenty years so that every practitioner should by now have been able to acquire sufficient background to realize its place at the top of preventive services. Dr. Alfred J. Asgis (1955) in a recent report stated: "The new emphasis in research, education and service gives hope that future generations will enjoy positive oral health. With the aid of scientific inquiry into problems of dental disease and oral health, it is believed that in future years people will reach old age retaining their natural teeth without the need of artificial substitutes. 'Lifetime Teeth'—or the preservation of the natural teeth for a lifetime—is a major aim of oral health service and the goal of the dental profession. Oral health conservation is the concept of present-day preventive dentistry embodied in all phases of dental practice." Further on he states: "It has been estimated that 11 per cent of the children aged 12 through 14 require orthodontic treatment. Dental statisticians tell us that the average person aged 16 has seven decayed, missing or filled teeth involving 14 tooth surfaces. We will not be wrong to expect today's children will lose 50 per cent of their teeth before the age of 40".

The fact that 11 per cent (which I feel, from my own clinical observation, is a gross under-estimate) of the children aged 12–14 require orthodontic treatment is not nearly as important as the realization that a very high percentage of these cases could have been prevented by adequate dental treatment between the ages of 2–12. Dr. Leuman Waugh (1955), a pioneer in orthodontics, former Professor of Orthodontics at Columbia University, wrote recently: "Dental caries of the deciduous teeth when neglected or when not given the proper dental care, is the principal cause of malocclusion of the permanent dentition." We all know the value of good occlusion and the results of malocclusion such as higher caries index, gingival, periodontal, and bony disturbances so often resulting in early loss; but I wonder how often we stop to think that a great share of these major dental problems encountered in adults is due to lack of good care during the early years of life.

There can be no question but that the goal of dentistry—"Lifetime Teeth"—cannot possibly be reached unless we make certain that each child has proper dental care from early childhood on, not only through rendition of adequate service but by educating parents so that they will be ever watchful in providing this care throughout childhood and adolescence. As a profession, surely we must derive not only enjoyment but great satisfaction as each of us in his daily work contributes towards the attainment of this goal which would be indeed a boon to mankind.

If the limit of our services for children is to stop toothaches, place temporary restorations and extract teeth, then there is no question but that there can be little enjoyment in rendition of such purely mechanical and entirely routine duties. Fortunately, this is not so. There are few branches of dentistry, if any, that encompass a greater scope. May I give you a few examples from that most important division of our field, Examination and Diagnosis?

Dental caries and infection are not the only abnormal conditions we are looking for, especially in the very young patient. By this time, although not very common, we may find one of the earliest signs of malocclusion—faulty

* A paper delivered to the American Dental Society of Europe on Tuesday, July 12, 1955.

cuspal plane relationship of primary cuspids. This, in turn, changes the relationship between the mandible and maxilla, resulting in a lack of harmony and very often in a unilateral crossbite in the posterior areas which, in turn, prevents normal growth of the maxilla and mandible with a definite disturbance in function. An extreme orthodontic problem arises which could so often have been corrected by simple and careful grinding of the teeth to change cuspal relationship. The earlier this is done, the easier the correction.

We must also bear in mind that the child of 4 years of age normally has not just the twenty teeth which have erupted but twenty-eight others which have begun to calcify and that there are continuous changes in growth and development. *These changes cannot be observed by simple mirror examination.* It is necessary that routine radiographs be taken at least every six months and on occasion more often, in order to follow the pattern of both constructive and destructive growth. Among other things, X rays are most important in rendering adequate service to the child patient in checking for the supernumerary teeth, congenital absence, ectopic eruption, faulty root resorption as well as caries and infection.

The dentist working for children has a great responsibility in observing and directing the pattern of growth and development of the dental arches and associated structures. In order to do this, he must know the normal, must recognize early deformity and surely should understand the aetiology of deformity. *Let us especially be mindful of the aetiologic factors over which we have some control* such as loss of proximal contact and premature loss of primary and permanent teeth. May I at this time repeat my earlier quotation from Dr. Waugh: "Dental caries of the deciduous teeth, when neglected or when not given proper dental care, is the principal cause of malocclusion of the permanent dentition." I believe we can interpret this very simply:—

1. Carious deciduous teeth or roots are not adequate space retainers nor are they adequate for proper function.

2. Temporary restorations such as cement fillings (which do disintegrate) do not come under the head of proper dental care. Contact points are usually imperative in establishing normal occlusion.

Next, let us briefly consider the factors over which we so often have power of guidance, including ectopic eruption, abnormal sequence of eruption, faulty root resorption and prolonged retention of primary teeth. Actually, these are all closely associated. For example, ectopic eruption of a maxillary first permanent molar may result in premature resorption of a root or roots of the second primary molar which in turn may result in premature loss of the latter and possibly abnormal sequence of eruption. On the other hand, faulty root resorption of a primary tooth can very easily cause the ectopic eruption of its successor. Faulty root resorption can also result in prolonged retention which, in turn, may result in abnormal sequence of eruption. Since these factors are important in establishing normal occlusion, we should know about their possibilities as soon as possible. This calls for early and regular examination, which without question should include adequate radiographic study. Ectopic eruption of the first permanent molars should be looked for before the teeth erupt. Faulty root resorption and prolonged retention of the primary teeth should be thought of long before the eruption of their permanent successors.

In addition to the preceding factors, let us not forget the importance of habits as related to malformation. Surely we have all seen hundreds of patients who have extensive malocclusion and facial deformities due to oral habits. If we are to discuss these intelligently with parents, we should be familiar with all aspects of the subject, not only dental but psychological. Often we hear that it is wrong to stop a child from abnormal sucking habits because of possible damage psychologically; and I am sure that psychologists are able to demonstrate this point of view clinically. However, it is my feeling that insufficient attention is given to possible *future* psychological damage if these habits are permitted to continue and result in oral and facial malformations with consequent personality damage. There is much to be said on both

sides of this question and probably the only truly feasible course of procedure is to deal with each individual case on its own particular basis. It is more than likely that in cases where the dental and psychological points of view may differ, dentist and psychiatrist can profitably work together in determining what course of procedure will be in the best interests of the patient.

At this point some of you may very well be thinking, "Ah, yes! It's all very well to derive enjoyment and satisfaction from the knowledge that one is doing an important job; but how is it possible actually to enjoy the performance of that job when the attendant circumstances may be so trying! In spite of all this, it is still difficult to work on child patients. They're unco-operative!" Let me say right now that I do not feel that dentistry for children is easy; but I do know that it *can* be enjoyable! The most important factor in this attainment is development of a pleasant relationship between the dentist and his young patient and the primary requisite in so doing is possession of an *understanding* of children. There are many factors involved in this, of course, but a satisfactory knowledge of the following three highly important areas should certainly go a long way in helping the dentist to understand why a particular child behaves in a particular way.

First of all, perhaps, comes knowledge of the constantly changing behaviour patterns of infancy and childhood. We as dentists must realize that a child at $2\frac{1}{2}$ years of age will behave quite differently from a 3-year-old, the 3-year-old from the 4-year-old—in short, that each age has, as Dr. Arnold Gesell (1943, 1946) has so aptly phrased it, its own "behaviour profile"; and, furthermore, each child his own particular developmental pattern. We must bear in mind constantly that degree of maturity is a major factor in behaviour.

The second important consideration in attempting to understand the behaviour of any given child is the environmental factors to which he is subject. What sort of relationship has he with his parents? Has he their love and understanding? Does he feel "wanted"? Is he properly disciplined? Too many people tend to think of discipline and punishment as being synonymous when they are, in reality, quite different concepts. And the over-punishment which sometimes masquerades as "discipline" can be highly deleterious.—Is the child dominated by one or both parents? Are the parents vying with one another for his affection? Is he "spoiled"? Is there a broken home? Is he treated as a respected member of the family circle? We should know how all these and many other environmental factors are apt to influence child behaviour.

The third important aspect of this question is *fear*. You have all heard it said that dentists fear the child patient more than the child fears the dentist. But the dentist who understands children will never fear them and the dentist who understands the fears of children will be better able to develop a pleasant inter-personal relationship with them.

A child entering the dental office in a state of fear is usually being influenced by one or more of the following factors:—

1. *Fear of the dentist*—or more properly, perhaps, of the whole situation, acquired, probably, through overhearing adult remarks about "dreading to go to the dentist". We all know how stupid we adults can be in the ways we sometimes speak in front of children. All too few of us give any thought to the manner in which our words may be affecting youngsters who may be within earshot. And much of our trouble with fearful children is, in my opinion, directly attributable to this source.

2. *Fear of the unknown*—this probably needs little explanation, for even we adults are familiar with the "butterflies-in-the-stomach" feeling induced by the need of facing a new and totally unfamiliar experience. In Jersild's discussion (1940) of fear in his *Child Psychology*, he writes: "As he (the child) grows older, the range of his fears grows wider, for as he acquires the ability to dwell upon the past and to anticipate the future, a large proportion of his fears concern remote and distant dangers and forebodings as to what the future may bring."

3. *Fear of pain*—which certainly requires *no* explanation! And our responsibility here is to

control pain so that this particular fear is laid to rest as quickly as possible. With today's materials and techniques available, we should certainly be able to do this, to a great extent at least. On those occasions when it is possible that pain *may* be inflicted, it will help, too, to be perfectly honest with the child and say: "Now, John, you may feel this just a bit", instead of "this isn't going to hurt", when you know perfectly well that it may. This honesty will give the child confidence in you, too, and the feeling that he can depend upon what you tell him. And if you can impress upon him that you are fond of him—you are his friend—and you are going to do everything in your power to make things just as easy as possible for him, you will have made great progress in obtaining not only the child's co-operation, but a real friend.

If, in dealing with small patients, we bear these facts in mind and take the trouble to be patient and understanding—to realize that these fears are very real and that they must be allayed—we shall have gone a long way in establishing our young patient's confidence in us; and in so doing we have taken the first big step in breaking down his fear and in building the pleasant inter-personal relationship which is the keystone to enjoyment of the patient.

CONCLUSION

To sum up briefly, I have tried in the preceding pages to bring out what I consider to be two of the cardinal factors in enjoyment of children as dental patients:—

1. Full appreciation by the dentist of the breadth of scope and tremendous, basic importance of children's dentistry in relation to the overall work of the profession; and

2. The necessity of proper knowledge and understanding of children and why they behave as they do, as being fundamental to enjoyment of them.

It is my earnest hope that you may find in this discussion and, perhaps, by perusing some of the books listed in the bibliography (all of which contain excellent further reference lists) at least some ideas which may be of help and of value to you as you go about your work, trying to do a really good job for the young people of our world.

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The Relationship of the General Adaptation Syndrome to the Periodontal Tissues in the Rat

Twenty of the Sprague-Dawley strain were used in this experiment. Ten were kept as controls, being fed on Purina fox Chow. The remaining 10 were stressed by immobilization consisting of wrapping the legs with adhesive tape to form a tab, which was attached to the floor board, and witholding food for a period of 68 hours. Care was taken to prevent any injury occurring.

At the end of the period of stress, the average loss of weight was 43·15 per cent, compared with an increase of 6·35 per cent in the control group. Nine of the stressed animals were in a stage of adaptation as indicated by a normal adrenal vascular supply, whilst one animal was in a stage of exhaustion. The stressed animals showed weight reductions of 76·6 per cent for the spleen, 78·8 per cent for the thymus, 7·8 per cent for the ovaries, and 6·1 per cent for the adrenals, as compared to the controls.

Sloughing of the keratinized layers of the gingival epithelium occurred in the stressed animals, and a split of the gingival papillæ at the junction between the reduced enamel epithelium and the oral epithelium was observed. Degeneration of the connective tissue of the periodontal membrane was apparent and there was a reduction in the number of osteoblasts and cementoblasts.

These findings were present in both the stage of resistance and that of exhaustion, but were more pronounced in the latter.—Ratcliff, P. A. (1956), *J. Periodont.*, **27**, 40.

BOOK REVIEWS

PARTIAL DENTURES. By MERRILL G. SWENSON, D.D.S., F.I.C.D., F.A.D.P., Professor of Denture Prosthesis, University of Oregon School of Dentistry, and LOUIS G. TERKLA, D.M.D., Assistant Professor, Operative Dentistry, University of Oregon School of Dentistry. $9\frac{3}{4} \times 6\frac{1}{2}$ in. Pp. 421, with 423 illustrations, 6 in colour. 1955. London: Henry Kimpton. 90s.

ONLY eighteen months ago Craddock commented on the lack of a modern text-book on the subject of partial dentures, and stressed the need for the filling of this gap in prosthetic literature. Since then several books have been published and each, in its own way, has made some contribution.

This latest book, although the most costly, can hardly be said to be the most outstanding. Its high price is no doubt necessitated by the 423 illustrations, which are contained in its 421 pages. The reviewer is the first to admit the real value of visual aid in teaching and is well aware of the merit of a well-chosen illustration to highlight some point which evades easy description. However, it is felt that the number of illustrations used in this book is excessive. Although diagrams on tooth preparation and denture design are well done, the general standard of photographic reproduction is not good. The main criticism, however, is of the selection of points requiring illustration. Surely the contribution of three identical photographs on different pages of the book depicting the fascia of a hydrocolloid conditioner, and featuring only the temperatures 160°, 140°, and 115° C. is indeed small. Similarly, the chapter on "Smoothing, Fitting and Tempering the Casting" gains little by numerous photographs of revolving abrasives or felt wheels being either charged with polishing agents or applied to the cast denture base. It is strongly felt that the cost of this work could have been greatly reduced by a more thoughtful selection of illustrations.

The book is divided into two sections. The first deals with the construction of partial dentures; in this, the operative and mechanical stages concerned in making cast gold partial dentures are described in chronological sequence. The second section is concerned with "Related Factors and Fundamentals of Partial Denture Construction". Some fifty-two principles of planning and design are advocated, but the rider is added that "these principles are neither complete nor applicable to all cases". The reviewer would suggest that rule of thumb rather than principle is described.

The writers have described one approach to partial denture construction and have failed to point out that there is generally an alternative and equally efficacious method. Accordingly there is no discussion of controversial issues such as load distribution in the free-end saddle case, or the preventive or remedial treatment of a mouth showing periodontal disease.

The main contributions made in this volume are concerned with occlusion. The method of recording the centric relationship of the jaws and the use of a simple hinge axis face-bow, focus attention on an aspect of partial denture construction which receives too little emphasis. The section dealing with the diagnosis and treatment of premature tooth contacts in centric relationship of the jaws is also clearly and simply written. Another point which is well treated is the weight distribution of the appliance in relation to the abutment teeth.

On the whole, however, this text is not one to be recommended to either the undergraduate student or the general dental practitioner. The prosthetic specialist would take from it isolated helpful points of technique.

G. A. L.

A TEXTBOOK OF ENDODONTOLOGY. Including the Clinical Pathology and Treatment of the Dental Pulp and Pulpless Teeth. By EDGAR D. COOLIDGE, B.S., M.S., D.D.S., LL.D., Emeritus Professor of Therapeutics, Preventive Dentistry, and Oral Hygiene, Chicago College of Dental Surgery, School of Dentistry, Loyola University,

Chicago, Illinois; and ROBERT G. KESEL, D.D.S., M.S., Professor and Head of Department of Applied Materia Medica and Therapeutics, University of Illinois College of Dentistry. $5\frac{7}{8} \times 9\frac{1}{8}$ in. Pp. 366, with 211 illustrations. Second edition. 1956. London: Kimpton. 56s.

THE second edition of this book may be recommended as a sound text of endodontia to both student and practitioner. Compared with its predecessor, entitled *Endodontia*, it shows three main differences: an alteration in title, the inclusion of Professor Kesel as co-author, and an expansion in text.

The early part of the book is essentially introductory in nature, dealing with dental pain and caries, treatment of dentine and pulp capping. Pulpotomy has been allocated, deservedly, a separate chapter. Treatment of vital and necrotic pulps, together with sections on the related anatomy, pathology, bacteriology and pharmacology, then follow. The pharmocological principles are described especially well, as is the question of healing and repair following therapy. If fault is to be found with an otherwise well-presented book, it is that the chapter on dental caries might well have been rather more abbreviated in favour of a fuller description on the surgical treatment of root ends. E. N.

THE BRITISH SOCIETY OF PERIODONTOLOGY

Annual General Meeting

At the Annual General Meeting of the Society held on Monday, Oct. 15, 1956, the following were elected as officers of the Society for this session:—

President: Professor M. A. Rushton;
Vice-Presidents: Mr. E. D. Farmer (*President Elect*); Mr. W. G. Cross (*Retiring President*);
Hon. Secretary: Mr. R. D. Emslie;
Hon. Treasurer: Mr. J. A. Pedler;
Hon. Editor: Mr. E. D. Farmer;
Hon. Librarian: Mr. E. C. Fox;
Representatives of Full Members: R. J. G. Grewcock; A. B. Wade;
Representative of Associate Members: Mr. A. E. Parrot.

EXAMINATION RESULTS

ROYAL COLLEGE OF SURGEONS OF ENGLAND

November, 1956

Licentiate in Dental Surgery.—The Board of Examiners in Dental Surgery reported to the Council that, at the recent Final Examination for the Licence in Dental Surgery, 107 candidates presented themselves, 87 of whom acquitted themselves satisfactorily.

Alford, B. G.; Amherst-Clark, J.; Ardouin, D. G. F.; Athill, N. B.; Bacon, J. P. A.; Banerjea, N.; Barber, R. E.; Barnard, B. O.; Barnes, D. S.; Baylis, R. A.; Billison, J. G. H.; Brooke Jones, D. L.; Brooks, A. W.; Brown, J. C.; Burman, R.; Carpenter, D. M.; Cavalot, Gloria; Chester, Anthea Mary; Coulson, B. R.; Cox, Jean Mary; Craig, S.; Dagger, Elaine Rosemary; Dickens, Pamela; Dickie, A. B.; Dunwoody, Mollie; Dyer, N. J.; Elliott, Jane; Everton, Gillian Monica; Fieldhouse, J. R.; Flett, A. W.; Fox, J. H.; Frankland, Joyce; Franklin, J.; Gaunt, L. M.; Gray, J. B.; Groves, J. F.; Hardingham, A. J.; Harris, M. J.; Harris, R. A.; Hastilow, M. J.; Henderson, D.; Hewett, B. V. H.; Hipwell, A.; Howorth, M. H.; Hudaly, S. I. T.; Humpherson, W. A.; Jenkins, T. J.; Knapman, W. R.; Knight, N. J.; Langrish, Brenda Margaret; Lervy, W. K.; Lesser, G. P.; Ljones, S. L.; Lowe, P. G.; Lucas, F. A. J.; Lux, L. B.; Magonski, W. T. J.; Malyon, Violet Mary; Mason, H. J.; Mercer, H.; Millman, C. K.; Mitchell, Jennifer Mary; Morrisroe, M. B.; Moss, J. P.; Neave, J.; Partridge, J. S.; Peebles, R. A.; Perkins, P. C.; Rees, D. E.; Rosair, D. G.; Sawyers, A. J.; Schloss, Susanne Erika; Schultz, L.; Sharpe, G. D.; Smith, D. O.; Smith, J. A. D.; Snell, P. J. H.; Sorabjee, S. E.; Stares, D. C. J.; Sullivan, G. E.; *Tompkins, Jean Gordon; Torry, I. W.; White, J. D.; Whiteman, P. D.; Wilson, R. A.; Winstone, A.; Woodbine, P.

* Examination passed in June, 1956.

UNIVERSITY OF EDINBURGH

November, 1956

Degree of Bachelor of Dental Surgery:—

Fung, J. N.; Mackinnon, H. C.; Thomson, Jemima Gray Park; Welsh, Margaret Thomson.

UNIVERSITY OF GLASGOW

November, 1956

Degree of Bachelor of Dental Surgery:—

Alexander, D. J.; Chrystie, R. A.; Edmiston, G.; Godfrey, D. H.; Grimstad, K. A.; Kelly, R. J.; Kennedy, Jean Wilson; Neilson, J. R.; Scott, W. B.

GIBBS TRAVELLING SCHOLARSHIP

The dental health department of D. & W. Gibbs have announced details of another travelling scholarship. This is the third scholarship presented by this firm in the interests of dental health, and they are to be congratulated and thanked for these munificent gifts. The recipient of the first scholarship went to study in Scandinavia and the second one went over to the U.S.A. This present scholarship will be to visit various European centres and will include attendance at the 12th International Dental Congress in Rome.